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Ontario. Environmental Assessment Board.

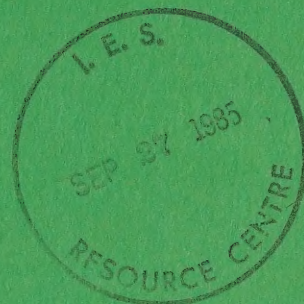
OW-85-03

IN THE MATTER OF AN APPLICATION BY ROTHSAY, THE
RENDERING DIVISION OF MAPLE LEAF MILLS LTD., FOR
APPROVAL OF THE UPGRADING OF ITS EXISTING BIOLOGICAL
WASTEWATER TREATMENT SYSTEM ON LOTS 8 AND 9, CONCESSION

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ENVIRONMENTAL ASSESSMENT BOARD



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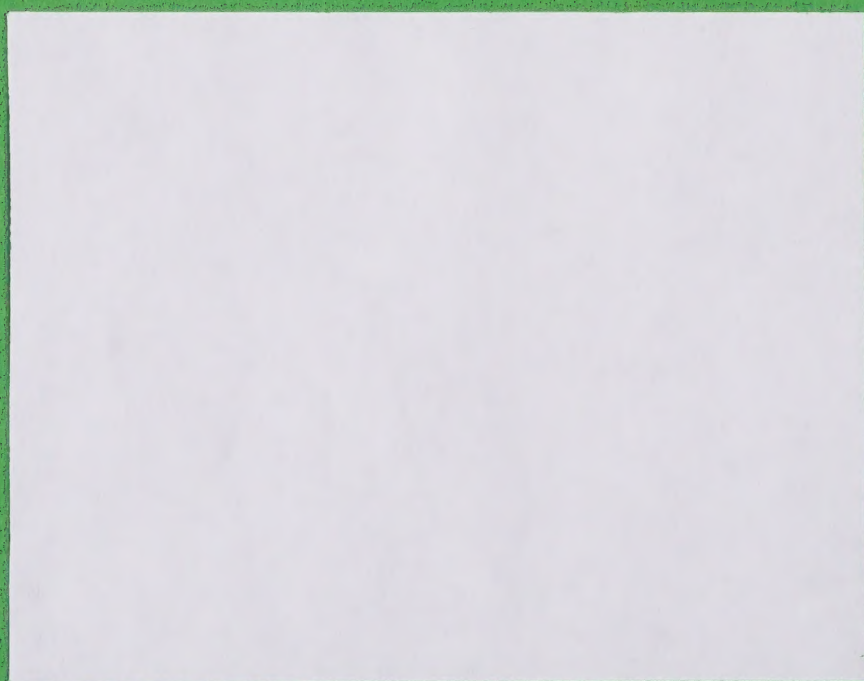
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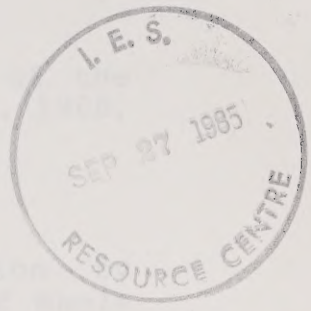
IN THE MATTER OF an application by
Rothsay, The Rendering Division of
Maple Leaf Mills Ltd., for approval of
the upgrading of its existing
biological wastewater treatment system
on Lots 8 and 9, Concession 13,
Township of Maryborough

Before: Robert B. Eisen, Q.C.
Joan E. Simpson

Report of the Board dated September 18,
1985

Environmental Assessment Board
1 St. Clair Ave. W. 5th Floor
Toronto, Ontario M4V 1K7





IN THE MATTER OF Section 20 of the
Municipal Water Services Act (R.S.O. 1980,
c. 323), as amended.

- and -

IN THE MATTER OF an application
Rothsay, The Rendering Division of Maple
Leaf Mills Ltd., for approval of the
upgrading of its existing biological
wastewater treatment system on Lots 8 and
9, Concession 13, Township of Maryborough

WITNESSETH

OW-85-03

IN THE MATTER OF an application by
Rothsay, The Rendering Division of
Maple Leaf Mills Ltd., for approval of
the upgrading of its existing
biological wastewater treatment system
on Lots 8 and 9, Concession 13,
Township of Maryborough

Before: Robert B. Eisen, Q.C.
Joan E. Simpson

Report of the Board dated September 18,
1985



IN THE MATTER OF Section 26 (1) of the
Ontario Water Resources Act (R.S.O. 1980,
c.361), as amended,

- and -

IN THE MATTER OF an application by
Rothsay, The Rendering Division of Maple
Leaf Mills Ltd., for approval of the
upgrading of its existing biological
wastewater treatment system on Lots 8 and
9, Concession 13, Township of Maryborough

WITNESSES

Dr. Earl E. Shannon

Robert Lee Van Biesbrouck

Peter DeBeyer

Cyril Slough

Mel Woodhouse

Lorne Murray

Peter Mason

Joe Kosalle

APPEARANCES

Dr. Earl E. Shannon	for Canviro Consultants Limited
John Tidball	for Ministry of the Environment
Joe Kosalle	for Maple Leaf Mills Limited
Cyril Slough	for Conestoga Lake Cottagers Association
Peter Mason	for the Grand River Conservation Authority
Lorne Murray	for the Grand River Conservation Authority
Zarco Tesic	for himself
Mel Woodhouse	for himself
Peter DeBeyer	for himself
Heather Pederson	for herself
Wilfred Watson	for himself
Douglas Parsons	for himself
D. Schiller	for himself
Francois Maggioni	for himself
Robert London	for himself
Dennis Craven	for himself

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REPORT

Maple Leaf Mills Limited (hereinafter referred to as the "applicant" or the "Company") operates a rendering plant situated on the west bank of Moorefield Creek just outside the Hamlet of Rothsay. It treats the waste water from the rendering operation and after storing it in two lagoons, spray-irrigates it on some 250 acres of land at the site as authorized by the Ministry of the Environment (MOE). The Company now proposes to improve its waste water disposal program by instituting a nitrification process, and discharging the effluent during the months of November, December, January and February (starting in November of 1986) into Moorefield Creek.

The headwaters of Moorefield Creek are situated in Maryborough Township about 4 to 5 kilometres north of Rothsay. South of Rothsay, the Creek continues another 15 or so kilometres where it flows into Conestoga Lake. The stream is in its most pristine state in the 5 kilometres north of Rothsay and another 5 kilometres south of the hamlet. Its quality then begins to deteriorate due to a number of factors. There is more cattle access in the lower reaches of the stream and the stream in those areas has less tree cover on the banks and so it tends to warm up. In addition, the discharges from the agricultural drains and from the drains servicing the the company's irrigated lands tend to impact

upon the Creek at that point. There are specifically two drains that service not only the Company's lands but apparently a larger drainage area. The impairment below the outfalls takes the form of excessive aquatic growth.

The upper ten kilometres of the Creek contain trout and the lower section has a fairly good warm water fishery consisting of bass, suckers and mud puppies. Mr. Van Biesbrouck, who appeared on behalf of the MOE described that part of the Creek from the headwaters down to Rothsay and the vicinity south of Rothsay as "gorgeous", and observed that it is capable of supporting a healthy fisheries population.

A rendering plant has operated at the site since 1962 or 1963. A predecessor of the applicant company, Canadian Pacific Enterprises Limited, purchased the plant in 1974 and in 1981 Canadian Pacific Enterprises Limited acquired control of Maple Leaf Mills Limited and the plant is now operated by the latter. The company employs about 110 people who are drawn, for the most part, from the surrounding areas. Mr. Joe Kosalle, the General Manager of the plant, testified that to his knowledge the plant at Rothsay is one of only two rendering establishments in the province that utilizes a waste treatment system. All others simply dump the wastewater into sewers to be treated by municipal treatment plants.

The company renders the blood, fat, bones and entrails, referred to as offal, of poultry birds and animals. Two basic products are produced from the rendering operation. The first is animal protein, which finds its way into feed and the petfood industry. The other product is the oil or tallow and there are two basic categories of tallow. The first is a feed grade which, again, is used by the feed industry and the petfood industry and constitutes the energy source in the feed. The other category is used in soap making, candle making, cosmetics, tires, road oils and in highway grade asphalt.

About 40 million gallons of waste water from the rendering operation must be treated each year. The waste water is first screened and then goes through a pH adjustment step where the acidity is adjusted. It continues to equalization tanks where the flow and strength of the waste are equalized to provide uniform volume and strength. After the addition of two coagulants, alum and polymer, the waste water proceeds through a dissolved air flotation process where oily, greasy fat material is separated out of the waste water for discharge into a sludge plant. The effluent proceeds to two aeration tanks where the organic material in the waste waters is stabilized; from there to two clarifiers and finally to two polishing lagoons with a storage capacity of 50 million gallons. The effluent is stored in these lagoons until the summer growing season and is then spray-irrigated on the Company property.

The facilities were upgraded in late 1983 and 1984 to provide additional dissolved air flotation capacity and an increase in the number of aerators thereby reducing the odours emanating from the lagoons. The introduction of a travelling gun irrigator and modification of the waste sludge pumps provided better operational flexibility and as a result of these and other improvements costing about \$400,000, there has been a significant reduction of the biological oxygen demand in the waste water.

In July of 1983, the Company experienced a flooding of the irrigation field that was due to over irrigation and a malfunction in the drainage system. There was an overflow of the waste water, containing high concentrates of ammonia, into Moorefield Creek and this resulted in a severe fish-kill in a five kilometre stretch of the Creek. The evidence produced at the hearing indicates that the Creek has been rehabilitated in great part to its pre-1983 condition. However, as a precaution against a similar occurrence, the Company applied to MOE and received permission in 1984 to lime-treat the effluent in the lagoons in order to substantially reduce the ammonia levels, and then discharge it into Moorefield Creek.

The proposal before the Board is divided into two stages: a) the upgrading of the waste water treatment and b) the discharge of the effluent into Moorefield Creek.

The upgrading of the waste water facilities would consist of new or expanded components in the present system, i.e. new aeration with seven times the capacity of the existing facilities, a new outlet flow chamber, a control building and a stream gauge. The additional aeration capacity will extend the retention period of waste water in the system from one day, as at present, to five days and will mean that the quality of the effluent proceeding to the lagoons will be of a higher quality. Specifically, the ammonia concentrations in the lagoons will drop from the present levels of 150-250 parts per million to less than 5 parts per million and possibly as low as 1 or 2 parts per million. The effluent would also have a low BOD and a low suspended solids level.

Discharge into the Creek will occur during the months of November to February when there is an outflow from Conestoga Lake Reservoir, thus allowing water to flow into the Grand River system. This would minimize the build-up of nutrients in the Lake. During these months there is the least uptake by plant life of the nutrients found in the water. In addition, the timing of the effluent discharge will correspond to the period when the Stream and Lake are at their lowest level of recreational use.

There would be a lagoon outlet flow chamber to allow plant operators to control discharges to the Creek. A stream gauge located on the Creek with telemetry equipment will transmit creek flow data back to the plant. Thus there would be

almost instant co-ordination between the rate of effluent discharge and the flow of the Creek.

Lastly, as a back-up system, spray-irrigation could be used to dispose of up to 20 million gallons of effluent in the event that, for one reason or another, it was determined that the total volume of treated waste water should not be discharged into the Creek. This would afford the system with a high degree of control and flexibility to meet unforeseen contingencies.

The full nitrification process would not be installed and used until November, December 1986 and January, February 1987. For 1985-86, the lime treatment method would be applied to the effluent prior to its discharge into Moorefield Creek.

Mr. Robert Lee Biesbrouck of the MOE discussed the assimilative capacity of the creek. The assimilative capacity is the difference between the total receiving capacity of a body of water and its background or naturally occurring wastes. Mr. Van Biesbrouck is presently the Environmental Engineer for the Hamilton-Wentworth District Office and is a qualified hydrologist. He has conducted monitoring and assessment studies of the Creek, the most recent assessment having taken place in April 1985.

His task was to construct a model that ultimately would provide a series of figures for the volume and quality of effluent to be discharged which would be co-ordinated with the total ammonium-nitrogen concentration of the effluent and with the flow of the Creek. The objective of these parameters is to have the quality of the Creek's water conform to Table I of the so-called "Blue Book" published by MOE entitled **"Water Management, Goals Policies, Objectives and Implementation Procedures of the Ministry of the Environment"**. Table I of the Blue Book sets out guidelines to ensure a high level of protection for fisheries and wild life.

There are a number of factors that are taken into account in constructing the model such as toxicity, nutrient levels, allowable oxygen levels in the stream and the pH.

The toxic materials of most concern are ammonia and hydrogen sulphide. Temperature and the pH are the factors determining their degree of assimilation in the Creek. The standard for un-ionized ammonia which is toxic is .02 milligrams per litre averaged over the day and for hydrogen sulphide it is 0.001 milligrams per litre averaged over the day. The concentrations however must be seen in relation to what is known as the limited use zone.

When an effluent is discharged from a bank outfall, it gradually mixes across the stream resulting in a zone which

may exceed MOE objectives. This zone is known as the limited use zone. The area of the zone may not exceed one half of the stream's width in order to provide a passage for fish. It is however, at the edge of the zone that the .02 milligram per litre limit for un-ionized ammonia and 0.001 milligram per litre limit for hydrogen sulphide must be met.

A further standard that has been observed by the Ministry is that the ratio of the discharge flow of the effluent to the stream flow should not be more than one to one and no waste should be discharged when the stream flows are below $0.03\text{m}^3/\text{s}$ as there is no effective mixing between the flows.

Regard must be had to the level of dissolved oxygen during the process of assimilation of BOD and ammonia in the natural stream. The dissolved oxygen must not be lowered to levels that will exert undue stress on the organisms in the stream including the fish population.

Finally, the model takes into account that the nutrients, phosphorus and nitrogen, must be kept low in order to prevent the build up of their levels in Conestoga Lake. Therefore the discharges will take place during the months of November to February inclusive when the Reservoir is not storing water.

These and other data such as mean depth, width of the river, time of travel are put together to provide a computer model which combined with the allowable pH, temperature and background conditions of the stream etc. will ensure that the concentrations at the edge of the limited use zone will not exceed the levels of Table I for ammonia and hydrogen sulphide.

The tables in Exhibit 9 and attached hereto as part of Appendix A have various readings for the total ammonium-nitrogen concentration and upstream flows. Given a variety of readings for these two parameters, the tables indicate the allowable effluent flow, the limits of the hydrogen sulphide concentrations and the total oxygen demand loads allowed in order that the nutrient concentrations at the edge of the limited use zone do not exceed the figures contained in Table 1 of the Bluebook.

The evidence is meagre as to the volume of waste water that entered the Creek, one way or another, in the years prior to 1983. Following the 1983 fish-kill, the proponent engaged new consultants, Canviro Consultants Limited, to advise it with respect to the operation and Dr. Earl E. Shannon of that firm was unable to give any evidence with respect to the pre-1983 situation. Mr. Kosalle, the General Manager of the Rothsay plant, testified that the increased use of scrubbers in the rendering operation over the past few years has

necessitated the use of larger quantities of water. He further testified that the operation had doubled in size during the last decade. Both Dr. Shannon and Mr. Kosalle state that the irrigation fields can absorb only 20,000,000 gallons of effluent in a year and based on this absorptive capacity of the fields and the experiences of 1983 and 1984, one might surmise that there has been a disproportionately larger growth in the last few years.

The proponent presented the Board with the suggestion that a committee should be established consisting of representatives from MOE, the Grand River Conservation Authority, the local ratepayers, the Conestoga Lake Cottagers Association and the Company. The function of such a committee would be to receive and discuss reports from the Company of its waste water treatment operation and to monitor the operation. The Company's representative also expressed readiness to place a bond or other security with the Director for the purpose of restoring and replenishing the Creek in the event of a fish-kill or other environmental mishap.

The applicant found support for its application in the Grand River Conservation Authority and in one local resident who was of the opinion that the proposal had some merit. However, the Conservation Authority in its Resolution of support (Exhibit 21) requested that it receive advance notice of all discharges into the Creek. The MOE did not take a

position either for or against the proposal but submitted a list of eight conditions (Exhibit 11) and attached hereto as part of Appendix "A" to be included in the Certificate of Approval if the Director should approve the application.

There is, however, widespread opposition to the application. The local residents have been dissatisfied with the past operations of the rendering plant, the odours emitted from it and the actual and suspected damage caused to the Creek by the plant effluent. Even though the odours emanating from the rendering operation are not part of the subject matter of this application, these odours and the 1983 fish-kill provide some background to explain the concerns of the residents as to the company's ability to properly control its wastewater treatment facility. They fear that the Creek will deteriorate further either through the gradual and cumulative impact of the annual discharges or suddenly and irreversibly through human or mechanical error in the wastewater treatment operation.

It is not only the local residents, who are in opposition to the proposal. Mr. Cyril Slough appeared on behalf of the Conestoga Lake Cottagers Association which represents 400 cottagers and their families who use the lake for swimming and other recreational activities. Mr. Slough testified that the algae growth around the lake in the vicinity of his cottage has increased dramatically this season as compared to

previous seasons. This, he implied, is attributable in part, to the plant effluent which reaches the Lake via the Creek. His organization is unalterably opposed to any activity that would further impair the quality of the waters of the Creek and hence the waters of the Lake.

Both the Association and the local residents would like to see some other method or alternative adopted by the applicant for wastewater disposal.

Included in the application of the Company were a number of alternatives dealing with waste disposal as follows:

- (a) the status quo;
- (b) expand the activated sludge plan to adequately handle BOD loading and upgrade spray irrigation site;
- (c) anaerobic pretreatment of condensates and blood concentrates to reduce existing plant organic loadings and upgrade the spray irrigation site;
- (d) the proposal of the Company which is the subject matter of this application.

Alternatives (b) and (c) would require a new and much improved underdrainage system of the irrigation fields to

replace the existing faulty system which was partly responsible for the 1983 flooding. The applicant chose alternative (d) and according to Dr. Shannon and Mr. Van Beisbrouck this was the best alternative of the four and would cause the least amount of environmental damage to Moorefield Creek.

The matter of alternatives is not mentioned in the Ontario Water Resources Act and, it is not considered an essential component of a proposal although hearing panels have found discussions of alternatives to be helpful. The purpose of considering alternatives is not to ascertain that the applicant has chosen the best alternative. Rather, it is to satisfy the Board that in comparison with other and even better alternatives, a reasonably good method or system has been selected by the applicant which merits approval. In this case, the Board is unable to conclude that a reasonably good method is being proposed.

The application presents some difficulty to the Board. The Company is able to argue that a better treated effluent will be discharged into Moorefield Creek in a controlled manner and during those months when the least amount of nutrient uptake is experienced by aquatic plants. The evidence also indicates that the Creek has the assimilative capacity to receive the effluent and still maintain a high level of protection for fisheries and wild life.

If this were an application to establish a rendering plant where one did not presently exist, and part of the operation involved the discharge of the effluent to a creek similar in all respects to that of Moorefield Creek, it is very doubtful that the Board would recommend approval. Approval would mean the degradation to some degree of a valuable natural environmental asset and one which is relatively unspoiled.

The present application is, however, concerned with an existing plant which, either due to new rendering techniques or the growth of its operation or both, finds that its present method of disposal is inadequate. The Board realizes that a rejection of the proposal could work an unexpected and perhaps an undeserved hardship on the Company by way of a new and more expensive proposal for the disposal of its waste water - and this after it has been allowed, either by express or tacit approval, to reach the present levels of effluent output.

The question for the Board to decide is whether it is in the public interest to recommend refusal of the application. The rendering operator can point to the fact that it provides employment to 110 persons, all to the public good. On the basis of environmental criteria, by which the Company's total undertaking must be ultimately judged, it can claim that it not only disposes of unwanted and undesirable wastes but, in addition, recycles them into useful products. However, in

the process, it creates a different undesirable waste in the form of an effluent, the disposal of which is the prime issue in this hearing. In the Board's opinion, the direct discharge of the effluent, even though of a higher quality, into the Creek and even though it meets the requirements of Table I of the Blue Book, will degrade the water in the Creek. The Board welcomes that part of the proposal dealing with the upgrading of the effluent but rejects its direct discharge into the Creek. From an environmental point of view, the positive aspects of the rendering operation are outweighed by the immediate and potential harm resulting from the disposal of the effluent under the application and this must be the deciding factor for the Board under the Act.

It appears to the Board that where there is environmental impairment without a compensatory public benefit, the public interest is not served. The Board therefore recommends that the application be denied, because it is not in the public interest.

In rejecting the application, the Board realizes that the applicant's proposal might mean less environmental damage than the present disposal method, yet the Board feels that it has no alternative but to reject the proposal. In its opinion, every effort should be made to prevent the discharge of effluent, and if that is impossible, then to minimize the discharge of effluent, that degrades the waters of the Creek.

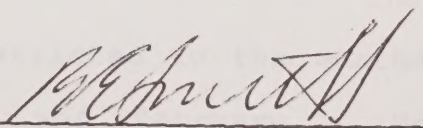
The Board wishes to make some comments with regard to the scope of the hearing and the evidence that was presented. The Company's discussion of the status quo concentrated mainly on the effluent treatment and compared it in a satisfactory manner to that contained in the proposal. This focus, important as it is, tended to overshadow other relevant information such as conditions affecting waste water treatment and the history of effluent control to date. A fuller discussion would have provided useful background information and a basis of comparison for the suggested change.

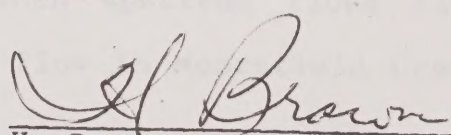
Another area that was inadequately addressed is the environmental damage caused by farming activities in the vicinity of the Creek. The evidence indicates that nutrients have found their way into the Creek especially in its more southerly portions as a result of cattle watering and crossings and through the use of fertilizers on the fields bordering the Creek. There was no evidence presented to indicate the respective contributions to the nutrient levels made by the plant's effluent and the farming activities and so the Board cannot draw any conclusions in this respect.

Perhaps some comments should be made with respect to the matter of geography. In spite of the number of requests for maps made by the Board there was not one map or sketch that contained the full length of the Creek or all the areas of the Creek pertinent to the hearing or relative distances, location of the plant, the various drainage outfalls and

other details that would have been of help. In particular, the Board was interested in ascertaining the distance of the outfall drains from the plant operation. Mr. Van Biesbrouck testified that the outfalls were three kilometres south of the plant in a straight line although he had earlier testified that the quality of the Creek began to deteriorate some five kilometres south of the plant. If the deterioration is partly due to the outflow of the irrigated spray the two distances are reconcilable; one being the distance in a straight line and the other being the distance as the Creek flows. This distance, whether 3 or 5 kilometres, becomes significant when considering the location of the outflow under the proposal.

It appears that under the proposal, the effluent, albeit of a better quality, will be routed to the Creek by means of an outfall ditch, which intersects the Creek at a point much closer to the plant and in the five kilometre zone south of Rothsay that Mr. Van Biesbrouck identified as being very sensitive. If this is so, then it is a serious flaw in the proposal. But, even if these geographic observations are not entirely correct, they would not alter the Board's recommendation since the proposal as a whole is not in the public interest.


B.E. Smith
Chairman


H. Browne, P.Eng.
Board Secretary

APPENDIX "A"

CONDITIONS SUGGESTED BY MOE IF APPROVAL IS GIVEN

1. Discharge of the waste must be made proportional to stream flow and adjusted daily as allowed in Tables 1 to 6.
2. The waste loads and concentrations of ammonia, hydrogen sulphide and TOD in the discharge must conform to those allowed in Tables 1 to 6.
3. The total phosphorus concentration in the effluent must not exceed 1 mg/l.
4. The pH of the effluent must be maintained between 7.5 and 8.5.
5. All other constituents in the discharge must conform to Ministry of the Environment Objectives for the Control of Industrial Waste Discharge in Ontario.
6. Discharge of effluent must be restricted to the months of November, December, January and February. No discharge will be permitted when upstream flows fall below $0.03 \text{ m}^3/\text{s}$. The upstream flow in Moorefield Creek

above the discharge point must be equal to or greater than the effluent flow.

7. A water level recording gauge must be constructed to Water Survey of Canada specifications upstream from the discharge point. A rating table relating water level to stream flow must be determined for this gauge to Water Survey of Canada specifications for both ice free and ice covered conditions prior to discharge commencing. The rating table must be updated regularly.
8. Effluent samples must be collected weekly during discharge. This analysis should include tests for pH, total and soluble phosphorus, total ammonium nitrogen, total Kjeldahl nitrogen, nitrite, nitrate, hydrogen sulphide, suspended solids, and BOD₅. The effluent should be monitored daily for pH, temperature, total ammonium nitrogen and hydrogen sulphide and appropriate adjustments made in the discharge. The effluent flow and stream flow must be recorded and the records made available to the Ministry of the Environment.

NHS & H2S ASSESSMENT OF MOOREFIELD CREEK AT ROTHSAV

TABLE: 1

NOVEMBER

MAX. AVERAGE DAILY pH= 8.3 TEMPERATURE=10.0

ALLCM CONC mg/l AT EDGE OF LUZ NH3= .560 H2S= .0140

MIN. AVERAGE DAILY pH= 7.7 TEMPERATURE= 2.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3=4.100 H2S= .0036

BACKGROUND CONC. IN mg/l NH3= .160 H2S= .0001

FLOW C/S m3/s	.057	.142	.283	.567	.850
MAX. pH AND T					
INNH3 @ LUZedge	70.00	79.30	84.70	88.90	90.70
INH2S @ LUZedge	14.20	28.80	42.00	56.30	61.50

MIN. pH AND T					
INNH3 @ LUZedge	65.80	77.50	83.70	88.60	90.30
INH2S @ LUZedge	40.90	56.10	66.40	74.90	79.00
NH3+H2S @ LUZedge					
T @ MAX. pH&T	108.43	112.47	115.35	117.61	118.91
T @ MIN. pH&T	112.86	113.35	113.50	113.63	113.60

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 1.0 mg/l

UPSTREAM FLOW m3/s	.029	.071	.149	.315	.483
ALLOW EFFLUENT FLOW m3/s	.029	.071	.134	.252	.367
ALLOWABLE H2S CONC mg/l	.017	.012	.011	.010	.010
ALLOWABLE H2S LOAD kg/d	.041	.074	.124	.220	.312
T. AMMONIUM-N LOAD kg/d	2.3	6.1	11.6	21.8	31.7
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 2.0 mg/l

UPSTREAM FLOW m3/s	.041	.108	.221	.450	.679
ALLOW EFFLUENT FLOW m3/s	.016	.036	.062	.117	.171
ALLOWABLE H2S CONC mg/l	.029	.025	.023	.022	.021
ALLOWABLE H2S LOAD kg/d	.041	.073	.123	.218	.310
T. AMMONIUM-N LOAD kg/d	2.8	5.9	10.7	20.2	29.5
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 3.0 mg/l

UPSTREAM FLOW m3/s	.047	.120	.242	.491	.739
ALLOW EFFLUENT FLOW m3/s	.010	.022	.041	.076	.111
ALLOWABLE H2S CONC mg/l	.045	.039	.035	.033	.032
ALLOWABLE H2S LOAD kg/d	.041	.073	.123	.218	.310
T. AMMONIUM-N LOAD kg/d	2.7	5.7	10.5	19.8	29.3
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 4.0 mg/l

UPSTREAM FLOW m3/s	.049	.126	.253	.510	.768
ALLOW EFFLUENT FLOW m3/s	.008	.016	.030	.057	.082
ALLOWABLE H2S CONC mg/l	.041	.052	.047	.045	.043
ALLOWABLE H2S LOAD kg/d	.041	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.7	5.7	10.4	19.5	29.3
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 5.0 mg/l

UPSTREAM FLOW m3/s	.051	.129	.259	.522	.783
ALLOW EFFLUENT FLOW m3/s	.006	.013	.026	.045	.065
ALLOWABLE H2S CONC mg/l	.076	.065	.060	.056	.053
ALLOWABLE H2S LOAD kg/d	.041	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.7	5.6	10.3	19.4	29.3
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

NH3 & H2S ASSESSMENT OF MOOREFIELD CREEK AT ROYHSAY

TABLE: 2 NOVEMBER

MAX. AVERAGE DAILY pH= 8.3 TEMPERATURE=10.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3= .560 H2S= .0160

MIN. AVERAGE DAILY pH= 7.7 TEMPERATURE= 2.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3=4.100 H2S= .0036

BACKGROUND CONC. IN mg/l NH3= .163 H2S= .0001

FLOW D/S m3/s	.057	.162	.283	.567	.850
MAX. pH AND T					
NH3 @ LUZedge	70.00	79.30	84.70	88.30	90.70
H2S @ LUZedge	16.20	28.80	42.00	54.30	61.50

MIN. pH AND T					
NH3 @ LUZedge	65.80	77.50	83.70	88.60	90.30
H2S @ LUZedge	60.90	58.10	66.43	74.90	79.00
NH3+H2S @ LUZedge					
T @ MAX. pH&T	108.43	112.47	115.36	117.61	118.97
T @ MIN. pH&T	112.86	113.35	113.50	113.33	113.60

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 10.0 mg/l

UPSTREAM FLOW m3/s	.056	.136	.271	.545	.819
ALLOW EFFLUENT FLOW m3/s	.003	.006	.012	.022	.032
ALLOWABLE H2S CONC mg/l	.155	.131	.121	.114	.111
ALLOWABLE H2S LOAD kg/d	.040	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.6	5.6	10.2	19.1	27.9
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 15.0 mg/l

UPSTREAM FLOW m3/s	.055	.138	.275	.552	.829
ALLOW EFFLUENT FLOW m3/s	.002	.004	.009	.015	.021
ALLOWABLE H2S CONC mg/l	.233	.198	.182	.171	.167
ALLOWABLE H2S LOAD kg/d	.040	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.6	5.5	10.1	19.1	27.8
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 20.0 mg/l

UPSTREAM FLOW m3/s	.055	.139	.277	.556	.836
ALLOW EFFLUENT FLOW m3/s	.002	.003	.006	.011	.016
ALLOWABLE H2S CONC mg/l	.311	.265	.243	.229	.223
ALLOWABLE H2S LOAD kg/d	.040	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.6	5.5	10.1	19.0	27.7
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 25.0 mg/l

UPSTREAM FLOW m3/s	.056	.139	.278	.558	.837
ALLOW EFFLUENT FLOW m3/s	.001	.003	.005	.009	.013
ALLOWABLE H2S CONC mg/l	.389	.331	.304	.286	.279
ALLOWABLE H2S LOAD kg/d	.040	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.6	5.5	10.1	19.0	27.7
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 30.0 mg/l

UPSTREAM FLOW m3/s	.056	.140	.279	.560	.839
ALLOW EFFLUENT FLOW m3/s	.001	.002	.004	.007	.011
ALLOWABLE H2S CONC mg/l	.468	.398	.365	.344	.333
ALLOWABLE H2S LOAD kg/d	.040	.073	.123	.218	.309
T. AMMONIUM-N LOAD kg/d	2.6	5.5	10.1	19.0	27.7
ALLOWABLE TOD LOAD kg/d	113.3	293.7	672.4	1406.0	2195.9

NH3 & H2S ASSESSMENT OF MOOREFIELD CREEK AT ROTHSAY

TABLE: 3 DECEMBER

MAX. AVERAGE DAILY pH= 8.3 TEMPERATURE= 5.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3= .820 H2S= .0119

MIN. AVERAGE DAILY pH= 7.5 TEMPERATURE= 1.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3= 7.050 H2S= .0026

BACKGROUND CONC. IN mg/l NH3= .160 H2S= .0001

FLOW D/S m³/s .057 .142 .283 .567 .850

MAX. pH AND T

TNH3 @ LUZedge 73.40 82.10 86.90 90.40 91.90

TH2S @ LUZedge 26.00 42.20 55.00 69.30 72.10

MIN. pH AND T

TNH3 @ LUZedge 67.90 73.90 84.70 89.30 90.83

TH2S @ LUZedge 44.00 59.80 68.73 79.70 80.60

NH3+H2S @ LUZedge

T @ MAX. pH&T 111.92 114.47 116.15 117.43 118.04

T @ MIN. pH&T 110.76 111.18 111.36 111.43 111.49

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 1.0 mg/l

UPSTREAM FLOW m³/s .028 .071 .141 .293 .425ALLOW EFFLUENT FLOW m³/s .028 .071 .141 .293 .425

ALLOWABLE H2S CONC mg/l .011 .038 .067 .096 .106

ALLOWABLE H2S LOAD kg/d .027 .069 .084 .151 .215

T. AMMONIUM-N LOAD kg/d 2.5 6.1 12.2 24.5 36.7

ALLOWABLE TOD LOAD kg/d 141.8 369.3 841.1 1748.9 2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 2.0 mg/l

UPSTREAM FLOW m³/s .033 .090 .186 .381 .577ALLOW EFFLUENT FLOW m³/s .024 .052 .097 .186 .273

ALLOWABLE H2S CONC mg/l .013 .011 .010 .009 .009

ALLOWABLE H2S LOAD kg/d .027 .049 .084 .150 .214

T. AMMONIUM-N LOAD kg/d 4.1 9.0 16.8 32.1 47.2

ALLOWABLE TOD LOAD kg/d 141.8 369.3 841.1 1748.9 2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 3.0 mg/l

UPSTREAM FLOW m³/s .041 .108 .220 .446 .672ALLOW EFFLUENT FLOW m³/s .016 .034 .063 .121 .178

ALLOWABLE H2S CONC mg/l .020 .017 .015 .014 .014

ALLOWABLE H2S LOAD kg/d .027 .049 .084 .149 .213

T. AMMONIUM-N LOAD kg/d 4.0 8.8 16.4 31.4 46.1

ALLOWABLE TOD LOAD kg/d 141.8 369.3 841.1 1748.9 2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 4.0 mg/l

UPSTREAM FLOW m³/s .045 .117 .236 .477 .719ALLOW EFFLUENT FLOW m³/s .012 .025 .047 .090 .132

ALLOWABLE H2S CONC mg/l .027 .023 .021 .019 .019

ALLOWABLE H2S LOAD kg/d .026 .049 .083 .149 .212

T. AMMONIUM-N LOAD kg/d 4.0 8.7 16.1 31.0 45.6

ALLOWABLE TOD LOAD kg/d 141.8 369.3 841.1 1748.9 2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 5.0 mg/l

UPSTREAM FLOW m³/s .048 .122 .246 .496 .745ALLOW EFFLUENT FLOW m³/s .009 .020 .037 .071 .105

ALLOWABLE H2S CONC mg/l .033 .028 .026 .024 .023

ALLOWABLE H2S LOAD kg/d .026 .049 .083 .149 .212

T. AMMONIUM-N LOAD kg/d 4.0 8.7 16.1 30.8 45.3

ALLOWABLE TOD LOAD kg/d 141.8 369.3 841.1 1748.9 2750.3

NH3 & H2S ASSESSMENT OF MOOREFIELD CREEK AT ROTHSAV

TABLE: 4

DECEMBER

MAX. AVERAGE DAILY pH= 8.3 TEMPERATURE= 5.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3= .820 H2S= .0119

MIN. AVERAGE DAILY pH= 7.3 TEMPERATURE= 1.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3=7.050 H2S= .0026

BACKGROUND CONC. IN mg/l NH3= .160 H2S= .0007

FLOW Q/S m ³ /s	.037	.162	.283	.567	.450
MAX. pH AND T					
INM3 @ LUZedge	73.40	82.10	94.90	90.40	91.90
INM2 @ LUZedge	28.00	42.20	55.00	66.30	72.10

MIN. pH AND T					
INM3 @ LUZedge	67.90	79.20	84.70	88.30	70.80
INM2 @ LUZedge	44.00	58.80	68.70	76.70	80.60
NH3+H2S X @ LUZedge					
X @ MAX. pH&T	111.92	114.47	116.15	117.43	119.04
X @ MIN. pH&T	110.76	111.18	111.34	111.43	111.49

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 10.0 mg/l

UPSTREAM FLOW m ³ /s	.037	.162	.283	.567	.450
ALLOW EFFLUENT FLOW m ³ /s	.003	.010	.018	.035	.052
ALLOWABLE H2S CONC mg/l	.067	.057	.052	.049	.047
ALLOWABLE H2S LOAD kg/d	.026	.049	.053	.149	.212
T. AMMONIUM-N LOAD kg/d	3.9	8.5	15.9	30.4	44.7
ALLOWABLE TOD LOAD kg/d	141.3	369.3	541.1	1748.9	2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 15.0 mg/l

UPSTREAM FLOW m ³ /s	.037	.162	.283	.567	.450
ALLOW EFFLUENT FLOW m ³ /s	.003	.007	.012	.023	.034
ALLOWABLE H2S CONC mg/l	.102	.086	.079	.074	.071
ALLOWABLE H2S LOAD kg/d	.026	.049	.083	.149	.212
T. AMMONIUM-N LOAD kg/d	3.9	8.5	15.9	30.4	44.7
ALLOWABLE TOD LOAD kg/d	141.3	369.3	541.1	1748.9	2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 20.0 mg/l

UPSTREAM FLOW m ³ /s	.037	.162	.283	.567	.450
ALLOW EFFLUENT FLOW m ³ /s	.002	.003	.009	.017	.026
ALLOWABLE H2S CONC mg/l	.136	.115	.105	.098	.095
ALLOWABLE H2S LOAD kg/d	.026	.049	.083	.149	.212
T. AMMONIUM-N LOAD kg/d	3.9	8.5	15.9	30.4	44.7
ALLOWABLE TOD LOAD kg/d	141.3	369.3	541.1	1748.9	2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 25.0 mg/l

UPSTREAM FLOW m ³ /s	.037	.162	.283	.567	.450
ALLOW EFFLUENT FLOW m ³ /s	.002	.004	.007	.014	.021
ALLOWABLE H2S CONC mg/l	.170	.144	.131	.123	.119
ALLOWABLE H2S LOAD kg/d	.026	.049	.083	.149	.212
T. AMMONIUM-N LOAD kg/d	3.9	8.5	15.9	30.4	44.7
ALLOWABLE TOD LOAD kg/d	141.3	369.3	541.1	1748.9	2750.3

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 30.0 mg/l

UPSTREAM FLOW m ³ /s	.037	.162	.283	.567	.450
ALLOW EFFLUENT FLOW m ³ /s	.001	.003	.006	.012	.017
ALLOWABLE H2S CONC mg/l	.204	.173	.159	.148	.143
ALLOWABLE H2S LOAD kg/d	.026	.049	.083	.149	.212
T. AMMONIUM-N LOAD kg/d	3.9	8.5	15.9	30.4	44.7
ALLOWABLE TOD LOAD kg/d	141.3	369.3	541.1	1748.9	2750.3

NH3 & H2S ASSESSMENT OF POOREFIELD CREEK AT ROTHSAY

TABLE: 5

JAN. & FEB.

MAX. AVERAGE DAILY pH= 8.3 TEMPERATURE= 3.0

ALLOW CONC mg/l AT EDGE OF LUZ NH3=1.900 H2S= .0040

MIN. AVERAGE DAILY pH= 7.3 TEMPERATURE= .0

ALLOW CONC mg/l AT EDGE OF LUZ NH3=7.670 H2S= .0024

BACKGROUND CONC. IN mg/l NH3= .303 H2S= .0001

FLOW CFS m3/s	.057	.142	.283	.367	.830
MAX. pH AND T					
INNH3 @ LUZedge	74.20	83.20	87.70	90.90	92.30
INH2S @ LUZedge	31.80	48.10	60.30	71.00	75.60

MIN. pH AND T					
INNH3 @ LUZedge	69.30	79.80	86.10	89.80	91.60
INH2S @ LUZedge	46.40	61.00	70.50	78.20	81.80
NH3+H2S @ LUZedge					
@ MAX. pH&T	127.41	131.54	136.21	136.32	136.97
@ MIN. pH&T	122.93	123.76	124.32	124.67	124.58

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 3.0 mg/l

UPSTREAM FLOW m3/s	.028	.071	.141	.283	.625
ALLOW EFFLUENT FLOW m3/s	.028	.071	.141	.283	.625
ALLOWABLE H2S CONC mg/l	.010	.038	.007	.006	.006
ALLOWABLE H2S LOAD kg/d	.025	.048	.082	.168	.212
T. AMMONIUM-N LOAD kg/d	7.4	18.4	36.7	73.5	110.2
ALLOWABLE TOD LOAD kg/d	177.3	465.0	1061.2	2221.2	3481.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 4.0 mg/l

UPSTREAM FLOW m3/s	.029	.030	.168	.345	.524
ALLOW EFFLUENT FLOW m3/s	.029	.032	.115	.222	.326
ALLOWABLE H2S CONC mg/l	.010	.009	.008	.008	.007
ALLOWABLE H2S LOAD kg/d	.025	.048	.082	.167	.211
T. AMMONIUM-N LOAD kg/d	9.6	21.3	39.9	76.6	112.8
ALLOWABLE TOD LOAD kg/d	177.3	465.0	1061.2	2221.2	3481.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 5.0 mg/l

UPSTREAM FLOW m3/s	.035	.093	.192	.392	.592
ALLOW EFFLUENT FLOW m3/s	.022	.049	.091	.175	.259
ALLOWABLE H2S CONC mg/l	.013	.011	.010	.010	.009
ALLOWABLE H2S LOAD kg/d	.025	.047	.082	.167	.210
T. AMMONIUM-N LOAD kg/d	9.5	21.0	39.3	75.6	111.3
ALLOWABLE TOD LOAD kg/d	177.3	465.0	1061.2	2221.2	3481.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 7.0 mg/l

UPSTREAM FLOW m3/s	.042	.108	.219	.444	.669
ALLOW EFFLUENT FLOW m3/s	.015	.034	.064	.123	.181
ALLOWABLE H2S CONC mg/l	.019	.016	.015	.014	.013
ALLOWABLE H2S LOAD kg/d	.025	.047	.081	.167	.210
T. AMMONIUM-N LOAD kg/d	9.4	20.7	38.3	74.5	109.7
ALLOWABLE TOD LOAD kg/d	177.3	465.0	1061.2	2221.2	3481.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 9.0 mg/l

UPSTREAM FLOW m3/s	.045	.116	.236	.472	.710
ALLOW EFFLUENT FLOW m3/s	.012	.024	.049	.095	.140
ALLOWABLE H2S CONC mg/l	.024	.021	.019	.018	.017
ALLOWABLE H2S LOAD kg/d	.025	.047	.081	.166	.209
T. AMMONIUM-N LOAD kg/d	9.3	20.3	38.5	73.9	109.8
ALLOWABLE TOD LOAD kg/d	177.3	465.0	1061.2	2221.2	3481.1

NM3 B H2S ASSESSMENT OF MOOREFIELD CREEK AT ROTHSAY

TABLE: 6

JAN. 8 FEB. 9.

MAX. AVERAGE DAILY pH= 9.0 TEMPERATURE= 3.0

ALLOW CONC mg/l AT EDGE OF LUZ NM3=1.900 H2S= .0060

MIN. AVERAGE DAILY pH= 7.3 TEMPERATURE= .0

ALLOW CONC mg/l AT EDGE OF LUZ NM3=7.670 H2S= .0026

BACKGROUND CONC. IN mg/l NM3= .300 H2S= .0001

FLOW C/S m3/s .037 .142 .283 .567 .850

MAX. pH AND T

NM3 @ LUZedge 74.80 83.20 87.70 90.90 92.30

H2S @ LUZedge 31.80 49.10 60.30 71.00 73.60

MIN. pH AND T

NM3 @ LUZedge 69.30 79.80 86.13 89.80 91.60

H2S @ LUZedge 46.40 61.00 70.50 79.20 81.80

NM3+H2S @ LUZedge

X @ MAX. pH&T 127.41 131.54 134.21 135.32 136.97

X @ MIN. pH&T 122.95 123.76 124.32 126.67 126.58

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 10.0 mg/l

UPSTREAM FLOW m3/s .046 .113 .239 .432 .724

ALLOW EFFLUENT FLOW m3/s .011 .026 .046 .085 .126

ALLOWABLE H2S CONC mg/l .027 .023 .021 .020 .019

ALLOWABLE H2S LOAD kg/d .025 .047 .081 .146 .209

T. AMMONIUM-N LOAD kg/d 9.3 20.5 33.4 73.7 105.5

ALLOWABLE TOD LOAD kg/d 177.3 465.0 1061.2 2221.2 3681.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 15.0 mg/l

UPSTREAM FLOW m3/s .030 .126 .256 .511 .767

ALLOW EFFLUENT FLOW m3/s .007 .016 .029 .056 .083

ALLOWABLE H2S CONC mg/l .041 .035 .032 .030 .029

ALLOWABLE H2S LOAD kg/d .025 .047 .081 .146 .209

T. AMMONIUM-N LOAD kg/d 9.2 20.3 33.0 73.1 107.5

ALLOWABLE TOD LOAD kg/d 177.3 465.0 1061.2 2221.2 3681.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 20.0 mg/l

UPSTREAM FLOW m3/s .052 .130 .261 .525 .788

ALLOW EFFLUENT FLOW m3/s .005 .012 .022 .042 .062

ALLOWABLE H2S CONC mg/l .055 .047 .043 .040 .039

ALLOWABLE H2S LOAD kg/d .025 .047 .081 .146 .209

T. AMMONIUM-N LOAD kg/d 9.2 20.2 37.9 72.8 107.2

ALLOWABLE TOD LOAD kg/d 177.3 465.0 1061.2 2221.2 3681.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 25.0 mg/l

UPSTREAM FLOW m3/s .053 .133 .266 .533 .801

ALLOW EFFLUENT FLOW m3/s .006 .009 .017 .034 .049

ALLOWABLE H2S CONC mg/l .048 .038 .034 .030 .029

ALLOWABLE H2S LOAD kg/d .025 .047 .081 .146 .209

T. AMMONIUM-N LOAD kg/d 9.1 20.1 37.8 72.6 105.9

ALLOWABLE TOD LOAD kg/d 177.3 465.0 1061.2 2221.2 3681.1

DISCHARGE REQUIREMENTS AT AN EFFLUENT T. AMMONIUM-N CONCENTRATION OF 30.0 mg/l

UPSTREAM FLOW m3/s .053 .134 .268 .539 .809

ALLOW EFFLUENT FLOW m3/s .006 .008 .015 .028 .041

ALLOWABLE H2S CONC mg/l .082 .070 .066 .060 .059

ALLOWABLE H2S LOAD kg/d .025 .047 .081 .146 .209

T. AMMONIUM-N LOAD kg/d 9.1 20.1 37.7 72.5 106.7

ALLOWABLE TOD LOAD kg/d 177.3 465.0 1061.2 2221.2 3681.1

EXHIBITS

No.

1. Letter of May 7, 1985 to Mr. H. Browne from Mr. C.E. McIntyre.
2. Memorandum signed by Mrs. Munro.
3. Affidavit of Service by Marilyn Corrigan sworn June 25, 1985.
4. Declaration by R.G. Steech dated May 16, 1985.
5. Affidavit of Publication in the Kitchener-Waterloo Record on June 12, June 19 and June 26, 1985.
6. Report of Canviro Consultants Limited dated May, 1985.
- 7-1. Transparency.
- 7-2. Transparency.
- 7-3. Transparency.
- 7-4. Transparency.
- 7-5. Transparency.
- 7-6. Transparency.
- 7-7. Transparency.
- 7-8. Transparency.
- 7-9. Transparency.
- 7-10. Transparency.
- 7-11. Transparency.
8. Album of photographs of site.
9. Assessment of Moorefield Creek at Rothsay (Revised) dated April 16, 1985.
10. Ministry of Environment publication "Water Management".
11. MOE Objectives for Control of Industrial Waste Discharges in Ontario.
12. Submission by E. Williams.
13. Submission by B. and B. Beier.
14. Submission by B. Glover.
15. Submission by Wendy Glover.

EXHIBITS (Cont'd...)

16. Submission of Margaret Schell.
17. Topographical Map.
18. Submission of Heather Pederson.
19. Map of Grand River Basin.
20. Drain Map.
21. Resolution of Grand River Conservation Authority No. 287-85.
22. Operational Curve for Conestogo Reservoir, 1985.
23. Submission of Heather Pederson.
24. Submission of Mr. & Mrs. Peter DeBeyer.

CA20NEA 85003

Ontario. Environmental Assessment Board
OW-85-03

IN THE MATTER OF AN APPLICATION BY ROTH
RENDERING DIVISION OF MAPLE LEAF MILLS
APPROVAL OF THE UPGRADING OF ITS EXISTI

**RESOURCE CENTRE
INST. FOR ENVIRON'L. STUDIES
UNIVERSITY OF TORONTO**



